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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Gas Turbine Engine

We, ROLLS-ROYCE LIMITED, a British company of Nightingale Road, Derby, Derbyshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns a gas turbine engine.

According to the present invention there is provided a gas turbine engine having a ring of angularly spaced apart turbine nozzle guide vanes each of which is pivotally mounted, and means for pivotally adjusting the positions of the nozzle guide vanes, each of said nozzle guide vanes having a hollow interior which is supplied with cooling air by way of a tube which is mounted within the hollow interior of the respective nozzle guide vane, slots being provided substantially at or adjacent to the trailing edge of each nozzle guide vane through which said slots the cooling air passes from the interior of the nozzle guide vane.

Each nozzle guide vane preferably has a gear connection with a common actuator ring, means being provided for rotating the actuator ring.

The tube may have at least one aperture therein through which at least part of the cooling air is directed towards the leading edge of the nozzle guide vane.

The engine may have an annular flow duct in which the said nozzle guide vanes are disposed, a portion of the inner wall of the annular flow duct being supported by said nozzle guide vanes.

The said nozzle guide vanes are preferably disposed between a high pressure turbine and a low pressure turbine of the engine.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:—

Figure 1 is a diagrammatic view partly in section of a gas turbine engine according to the present invention, and

Figure 2 is a broken-away sectional view

on a larger scale of part of the structure shown in Figure 1.

Referring to the drawings, a gas turbine engine 10 has an annular flow duct 11 in which are mounted, in flow series, a low pressure compressor 12, a high pressure compressor 13, combustion equipment 14, a ring of angularly spaced apart nozzle guide vanes 15, a high pressure turbine 16 which drives the high pressure compressor 13, a ring of angularly spaced apart nozzle guide vanes 20, and a low pressure turbine 21 which drives the low pressure compressor 12. The turbine exhaust gases are directed to atmosphere through a jet pipe 22.

The annular flow duct 11 has an inner wall a portion 23 of which is supported by the nozzle guide vanes 20 from the outer casing 24 of the engine. Mounted within the inner wall portion 23 is a radially extending wall 28 which carries an outer race 25 of a bearing 26. The bearing 26 has an inner race 27 which is supported on a shaft 30, the shaft 30 being secured by bolts 31 to the low pressure turbine 21.

Each of the nozzle guide vanes 20 is mounted on a pivot 33, and is connected to a spur gear 34. The spur gears 34 mesh with a common actuator ring 35 which is itself driven by a pinion 36. The nozzle guide vanes 20 may thus be adjusted by driving the pinion 36 by way of a motor (not shown).

Each of the nozzle guide vanes 20 has a hollow interior 40 in which is mounted a radially extending tube 41 which extends radially outwardly of the hollow interior 40. The tube 41 is provided, adjacent its radially outer end, with cooling air from an inlet 42. The tube 41, in the portion thereof within the hollow interior 40, is provided with a plurality of radially spaced apart apertures 43 through which the cooling air is directed towards the leading edge 44 of the nozzle guide vane 20. The cooling air which is thus directed towards the leading edge 44 is caused to reverse direction and to emerge through slots 45 substantially ad-

5 jacent the trailing edge 46 of the
nozzle guide vane. The slots 45 are
so disposed that streams of cooling
air coming through them flow over the
trailing edge 46 so as to impinge on the adja-
cent streams and have a scrubbing effect on
the trailing edge, whereby to cool the latter.

WHAT WE CLAIM IS:—

10 1. A gas turbine engine having a ring of
angularly spaced apart turbine nozzle guide
vanes each of which is pivotally mounted, and
means for pivotally adjusting the positions of
the nozzle guide vanes, each of said nozzle
guide vanes having a hollow interior which is
15 supplied with cooling air by way of a tube
which is mounted within the hollow interior of
the respective nozzle guide vane, slots being
provided substantially at or adjacent to the
trailing edge of each nozzle guide vane through
20 which said slots the cooling air passes from the
interior of the nozzle guide vane.

25 2. A gas turbine engine as claimed in claim
1 in which each nozzle guide vane has a gear
connection with a common actuator ring,
means being provided for rotating the actuator
ring.

3. A gas turbine engine as claimed in claim
1 or 2 in which the tube has at least one aper-
ture therein through which at least part of the
cooling air is directed towards the leading edge
30 of the nozzle guide vane.

4. A gas turbine engine as claimed in any
preceding claim in which the engine has an
annular flow duct in which the said nozzle
guide vanes are disposed, a portion of the inner
wall of the annular flow duct being supported
35 by said nozzle guide vanes.

5. A gas turbine engine as claimed in any
preceding claim in which the said nozzle guide
vanes are disposed between a high pressure
turbine and a low pressure turbine of the en-
40 gine.

6. A gas turbine engine substantially as de-
scribed with reference to and as shown in the
accompanying drawings.
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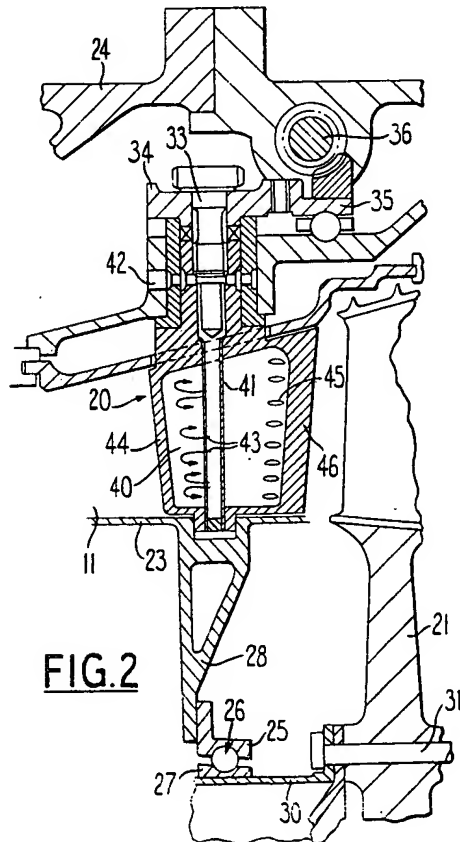
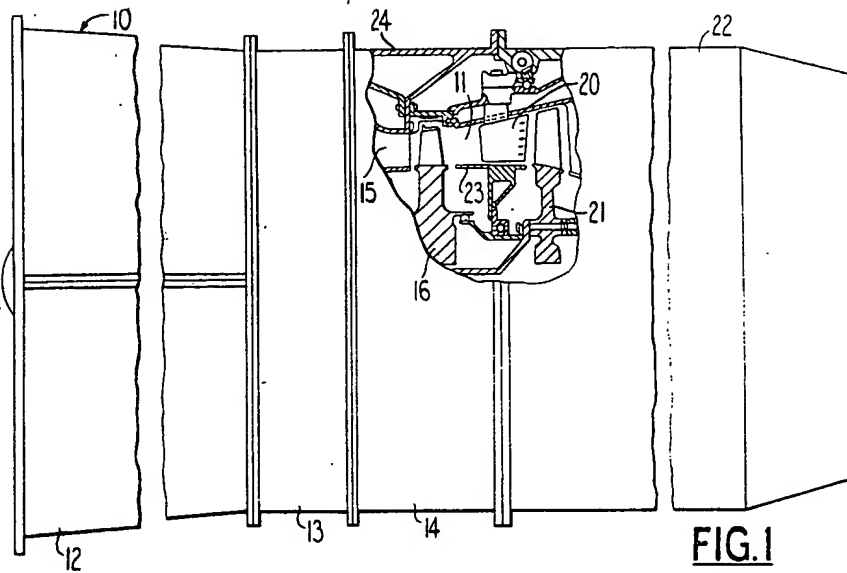
(Keenan et al) (7-1968)

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale



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